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HEAT TRANSFER IN COMPRESSED GASES. II EMPIRICAL EQUATION FOR THE DEPENDENCE OF THE THERMAL CONDUCTIVITY OF COMPRESSED GASES ON TEMPERATURE AND PRESSURE

> By Ye. A. Stolyarov, Leningrad Inst of High Pressures Submitted 5 Apr 1949

The heat conductivity of compressed gases in the range of temperatures close to the critical is of importance from the point of view of utilization of the gases in question as jet fuels and rocket propellents. It is not suggested that the author had in mind any such application: this is merely mentioned as a possibility.

On the basis of the study of published and experimental data on this subject, the author derived an empirical equation which satisfactorily describes the thermal conductivity of compressed gases for a wide range of temperatures, giving an acceptable comparison for the predicted and experimental values in the cases of hydrogen, nitrogen, air, methane, and carbon dioxide.

The variations in the constant F in the equation

and of Prandtl's criterion were determined with respect to temperature and pressure, showing that with an increase in pressure, the value for the constant F decreases, but that the value for Prandtl's criterion increases. The author states that these variations are especially great close to the critical temperatures, indicating the presence of another thermal conductivity mechanism under these conditions.

Extensive tabulations of numerical data on heat conductivity, values of the constant F, and values of Prandtl's criterion are given for the gases mentioned above in addition to air (author's data) and oxygen (E. Borovik's data).

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